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HERBAL FACTS AND THOUGHTS

BY ARNOLD C. KLEBS

Reprint of an introduction to the Catalogue of Early Herbals from the Library of Dr. Karl Becher, Karlsbad.
L'Art Ancien S. A., 7, Piazza A. Manzoni,
Lugano, Switzerland. Bulletin XII. 1925

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HERBAL FACTS AND THOUGHTS*).

This unique collection both delights and distresses me. The beauty of its copies and the completeness of the various series of editions must be a source of joy to whoever takes an interest in the early books for their matchless typography, superior paper, woodcuts and beautiful bindings. But to me, less of a collector and bibliophile than a student of the historical position of these books, it was not an unmitigated pleasure when I compared the present catalogue with a list of incunabula herbals**) which some years ago I had compiled. I had to travel thousands of miles to visit libraries, to consult numerous catalogues, had an endless correspondence, hundreds of photographs, only to complete and later to correct the data of my list. And here I find that a confrère in Bohemia had brought together specimens of practically all the editions which I had been able to enumerate, gathering quietly during years of patient search, probably also in all the corners of the world, what had not been harvested before. For they are very rare these old herbals, as most of the books that had hard usage. And while rarity is perhaps what appeals most to the collector, the student of the history of human endeavor is chiefly attracted towards an investigation of the causes of this rarity, in the setting of the times when these books were produced. The study of the early printed books which we call incunabula heretofore rather neglected by the historian of science, is coming more and more to the fore. Gradually it is being recognized that the art of printing furnished science with a means of multiplying and distributing for comparison its records, such as writing could never provide. Thus the first presses turned out books which must be historical monuments

*) The word «herbal» in English designates a book on useful herbs while the French by *herbier* and the Italians by *erbario, erbolario,* primarily mean a collection of dried and pressed herbs, for which in English we use the term *herbarium,* while the others have no special word for the book. A priori it would seem that the earliest herbal would be the one both French and Italians still designate as a collection of specimens of dried plants, it being obviously the easiest way of bringing them together for future reference, but it is a matter of record that the oldest herbarium of this kind came long after the advent of the written, painted or printed book, for it was invented only in the first half of the sixteenth century by the Englishman John Falconer when botanizing or rather herborizing in Italy.

**) Arnold C. Klebs. Herbals of the fifteenth Century. Papers of the Bibliographical Society of America, 1917, xi and 1918 xii. Reprinted for private circulation. Chicago, University Press, 1918.

of the highest order, worthy of special study not only of the texts but of everything that contributed to their production and was apt to throw light on the cultural relations of a germinative period the significance of which has been obscured by the brilliancy of the achievement immediately following.

Medical men regard the great anatomical work, the "De humani corporis fabrica" by Vesalius, with its beautiful woodcuts by Van Calcar, published in Basel in 1543, as the first milestone in the evolution of the healing art into a science*). The "Gart der Gesundheit" occupies a similar place with regard to the natural sciences in general. As a precursor to the superior herbals of the following century, it might be compared with the works which preceded Vesalius' Fabrica. But these latter are infinitely cruder in comparison, the delineation of parts of the human frame offering apparently more difficult problems for the artist, which a longer schooling had enabled the herb painter and his successor the woodcutter to overcome more easily. The conveniently arranged and indexed contents of the "Gart", and especially the large and on the whole faithful pictures of plants, not only placed at the service of the professional herbcutter, the apothecary and the physician a reliable, clear and inexpensive guide such as had not been known before, but it must also have made a strong appeal to the one who desired to become better acquainted with his environment and driven by an inner impulse to the observation of the surrounding nature and the comparison of the objects among themselves.

It has been held that the herbal does not enter into the class of scientific works like Vesalius' Fabrica, that it was intended as a popular book, as a sort of herb pharmacopea for the poor. In the preface to the Apuleius indeed the physician intent upon exploiting poor patients is scorned and also the "Gart" makes a prefatorial claim of wishing to serve the common weal (gemeynen nutz). But such direct appeals to the people were not unusual in all sorts of books at the time, and especially in those written in the popular tongue. And even if they contained expressions of disdain for professional greed and inefficient erudition, this did not hinder their use as school-books and their being read by the educated citizen who was forcing himself into the foreground of communal life, clamoring

*) It is interesting to note here the fact, recurring again in the history of the subject under consideration, that it was not the Editio princeps of Vesal's Fabrica, nor its enlarged reprint of 1555, that stimulated directly and most extensively the following anatomical research. This broad influence has to be traced to the editions that left a London press with the copper plate engravings by Geminus, inferior to the originals, but apparently more popular.

more and more for the right of fitting himself for and of partaking in intellectual endeavors. It is a narrow prejudice which denies to the popular book, the Volksbuch, its true historical significance in scientific evolution. Latin as an international language was a great convenience, but the vital thinking which made modern science was done in the mother's tongue and here are the first beginnings of a literature which gradually became the rule. In another part of the preface of the "Gart" this aim is clearly expressed: that it may help all the world, learned and unlearned, have I had it made in German ("das es aller welt gelerten und leyen zu nutzen komen mage, habe ich es in taütsch laissen machen")*).

The line of herbal evolution up to the appearance of the "Gart" of 1485, the chef d'œuvre of all the early herbals and the real starting point for the future direction of scientific publications, is comparatively simple. Lignamine, an influential and intelligent papal protégé, though not a physician as has been asserted, took an active part in the humanistic endeavors of the Roman intelligentsia. Clear-eyed he saw the possibilities and took advantage of the new art of printing which the two Germans, Schweinheim and Pannartz, had brought to Subiaco and Rome in the sixties.

Like those other Roman nobles, the Massimi, who had opened the doors of their colonnaded palazzo to the northern printers and their presses, he also took them into his house, less generously, however, for he placed his own name into the books produced by their skill, posing for centuries as their printer which probably he never was. But in the furnishing of "copy" and historically interesting introductions he was a past master. Only the acquaintance with and the study of the manuscript literature, and a preference for classical and scientific subjects could have enabled him to furnish something new to the printers, who had flooded the market with theological literature. In his search among the treasures of the Benedictine Monastery of Monte Cassino he came upon an illustrated MS. of the Herbarium of Apuleius, a book which the herborizing monks of the day still held in high esteem though its origins can be traced hundreds of years further back. The idea of publishing the Apuleius suggested itself by similar work done in Rome.

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*) Under the mystic spell of Greek and Latin etymology, most historical writers have persisted in calling the "Gart der Gesundheit": "Hortus sanitatis germanice", which the preface of the book authorizes as well as that of "Herbarius". The general absence of clear titles in the front of these books imposes upon us the necessity of making a choice, thus I have selected the brief terms "Herbarius", "Gart" and "Hortus" to distinguish three different but well defined types of publications.

Ulrich Han, another early Roman printer, had given the example by illustrating his editions of the Meditationes of Cardinal Torquemada (in 1467, 1473 and 1478), usually considered the first illustrated book printed in Italy. Then between 1470 and 1480 appeared from other presses the Mirabilia Romae, a guide book for pilgrims, with woodcut views. Lignamine himself, as we know from his Sibylline portraits in the *opuscula* of his Sicilian friend and compatriot Barbieri, had in 1481 exploited the work of an engraver whose name we ignore but who, to judge by the style of his work, was probably an Italian. For reasons which it would take too long to recite here, I believe that it is not at all impossible that Lignamine actually published the Herbarium of Apuleius at the same time or shortly before the *opuscula* by Barbieri, that is before December 1481 and not in 1483 or 4 as has been heretofore asserted on the basis of certain dates given in the printed introduction*).

The fixation of the date of the issue of Lignamine's Herbarium has a certain importance, for had it appeared only at the end of 1483 or in 1484, it could hardly have had any influence on the next step in herbal production which was taken by Peter Schöffer in Mainz early in 1484. As we now see the matter, a printed copy of the Apuleius had ample time to reach Mainz and directly suggest to the shrewd pupil and partner of Gutenberg a venture in which he was to prove himself eminently successful.

But even if there was time for Schöffer to get his inspiration from the Roman book we will be told that the two books bear no comparison, that the Apuleius was a crude product and Schöffer's Herbarius an infinitely finer production.

When we lay the two books side by side, as we can in this collection, we have to be powerfully prejudiced if we cannot detect the striking points of resemblance. We find 131 plants in the Apuleius and 150 in the Herbarius. A serial number at the top, the plant picture below, then its name and synonymes, vestiges of a description, its habitat with its medicinal uses. That is the arrangement of the material in both books, an arrangement that had been consecrated through centuries by generations of copyists, and now in printed form opened routes for the further development which was to set in with truly vertiginous speed. It is beside the mark to claim that the pictures

*) How Schreiber in the latest review of the subject: Kräuterbücher des XV. und XVI. Jahrhunderts, München 1924, p. IV, manages to date Lignamine's edition 1493 is as little understandable as his characterization of the pictures as "frightfully crude and notable chiefly because of the black snake-like worms curling around the roots of the plants [!]".

of the Apuleius are not drawn from nature, that it uncritically reproduces the superstitious herb lore of past generations, and that this is less the case in the Herbarius, etc., etc. The important point is that Lignamine took the first step, actually produced a herbal with plant pictures, and that this first step proved successful. That the scene of greatest success shifted to the north and from there spread to other lands, eventually reaching Italy again, is explicable by cultural and racial peculiarities which are patent in other branches of Renaissance art, letters and science.

The success of the Herbarium of Apuleius must have been great, if the great rarity of extant copies gives a measure. It was, however, not reprinted during the fifteenth century. The success of Schöffer's Herbarius may be called truly phenomenal. Out of the Schöfferian officina but one edition issued notwithstanding Schreiber's artificial enumeration of three. Schöffer had plans for another herbal and with characteristic energy he turned from the curtain-raiser to the real play.

While he did so with his band of typecutters and founders, his staff of erudites, medical and other, his artists and woodcutters, whose names and personalities we would give much to know, the Herbarius made a triumphal journey through all civilized European lands. Within a few years after its first appearance, new editions of it were made by printers in several other German towns, in the Netherlands, in Paris, and finally in Italy again, here hiding its identity under the name of Arnoldus de Villanova, as if intent upon misleading later bibliographers. The many editions of the Herbarius merit more careful study than they have received. I cannot enter upon it here, because I wish to concentrate myself upon the following work, the "Gart der Gesundheit", which appeared on March 28, 1485.

The „Gart" presents several intricate problems. I can only in passing touch upon questions such as that of its author, the sources of its contents, the relation of the book to previously printed scientific works, all questions the solution of which still lacks precision possibly because we do not possess sufficient data for it. The historians who have dealt with this part of the subject on the whole have often confused the issue and perhaps better progress can be made when once we have absolute clarity about the contents, pictures and historical relations of at least all the incunabula herbals. One cannot insist strongly enough upon the necessity of studying the complete series of the early editions. Generalisations derived from the study of isolated editions are as worthless as similar ones based on the reading of impure MS. texts.

Of the "Gart" alone, to say as yet nothing of its numerous direct and indirect descendants, each year of the ending century absorbed a new reprint from the original edition. Its direct descendants, the Arbolayre and Grant Herbier, again in numerous editions, brought about a similar movement in France and later in other countries. Six years later, in 1491, a new series of books, the Latin Hortus sanitatis, an enlarged "Gart" in international language, in Latin, and again translated, entered upon its tour through the world.

The authors of the "Gart" as well as of the Herbarius are unknown. Although it is a priori improbable that the Gart had a single author, a reference (in the chapter Bolus armenus of the Gart) by a Meister Johannes von Cube to a favorite gold medicine of his has been thought by some to mark his authorship of the book. The man existed, as town physician at Frankfurt, and it is quite possible that in the cooperation set up in the Schöfferian officina for this as for other works, he had his share, especially as we know of the close relations of Peter Schöffer with the life of that town, in which he had acquired citizenship in 1479. But it seems to us that nothing is accomplished by proclaiming Cube as the author of a book, which in the anonymous garb of „Gart der Gesundheit" has well established a historical place for itself. The descriptive term also stamps it as a product of a multiple cooperation which well merits historical investigation.

The book states in the text its authorities quite plainly, making not the slightest pretence to originality, as we understand the term. To report faithfully what the old masters had said on those subjects was the principal aim. That had been done in the herbals of the past thousand years and the printed book differed from that custom only in slight details. The sources were present in big tomes on the natural sciences, many of which were available already in printed form, as for instance the "Speculum naturale" and "doctrinale" of Vincent de Beauvais, the Paduan „Aggregator" of Dondi, the "Proprietates rerum" of Bartholomaeus Anglicus, the Etymologiae of Isidor and other encyclopaedic works with their masses of traditional scientific information inviting "exscription". But what undoubtedly stimulated most the printing of the "Gart" was the current popularity of the illustrated French text of the Platearius "Circa instans", a book which seems to have had a wide distribution in manuscript form even outside of France in the fifteenth century. Neither the German text nor the woodcut illustrations are straight copies from any of the known manuscripts of Platearius, but it is evident that both compiler and

artist had the book before them when they composed the new book. An older MS. of the "Gart" has not been discovered although diligently searched for. The probability that the text was composed for the printer's immediate use makes it seem extremely improbable that one will ever be found.

Very soon after the appearance of the "Gart" of 1485 the text of the French Platearius was printed in France under the name of "Arbolayre" and it is significant that this edition was illustrated by the woodcuts of German craftsmen — an inspiring example of peaceful international cooperation. We shall return to this subject again.

The illustrations of the "Gart" have been much discussed. As a rule they were dismissed as crude copies from traditional models. That is certainly true for some of the cuts, but it is a fact that rather increases than decreases the interest in them. On careful examination it will become apparent that such traditional pictures were copied only in the cases of those plants which were unknown in Central Europe or known only from the dried specimens on the market, or from the descriptions in the literature. They were like interrogation marks, stimulating further search, and as we go through the series of books we find how in the course of years corrections and substitutions were made in the illustrative material. Already in the Editio princeps of 1485 an enormous advance towards naturalism was made in some of the cuts. But naturally the technique of woodcutting demanded simplest outlines and the reliance on line for plastic expression. Coloring by hand was at first intended but soon dispensed with. We who today in our aesthetic demands are drawing away more and more from the slavish copying of nature and demand that a work of art expresses type and character, can better appreciate the didactic value of these simple drawings than the previous generation to whom the photographic appealed as the highest form of truthful representation.

Schöffer himself does not seem to have been much interested in illustrated books. He took them up tardily and gave them up early. Probably he was already too old for the novelty. As the technical genius in the enterprise of Gutenberg and Fust, his main contributions were made in the past. But he opened the doors to younger and, in the matter of illustration, to very able ones. Only the name of Reuwich, who figures as the printer of the famous Breydenbach voyage to the Holy Land (1486), can be connected with the artistic ventures of Schöffer's establishment. The minute observation and the expressive rendering of man and his environment, which we are admiring in the later work of the Dutch "Little Masters", seems to have characterized

the work of this man who also hailed from the Low Countries. If it is he who drew and cut the magnificent frontispiece for the Breydenbach, the great views of towns and the quaint scenes of strange people and animals, it was also he who had a hand in the illustration of the "Gart". Well may the latter have offered a welcome field of experimentation and practice when preparing for the more complete task. I know it is a disputed point, whether or not he worked on the pictures of the "Gart". The stylistic similarity of some of the "Gart" pictures to those of the Breydenbach seems conclusive. Those who are enabled to put the books side by side will not find it difficult to decide.

As the Herbarius of the year before, so the "Gart" of 1485 does not carry Peter Schöffer's signature. Only the two well known shields of the firm are there and point to the master's identity, to him who, twelve years before, had printed below one of his books:

Artificem commendet opus, non propria lingua.
Factis quisque suis non dictis glorificetur.

To characterize the "Gart" as purely a publisher's enterprise infers that a mechanical rather than an intellectual genius presided over its conception and execution, also that its aim was primarily financial gain. Of course publishers then as now did not conduct their affairs on a philanthropic basis, they and also those working with and under them were intent on getting on and the basis of that is making a living. But the production of the "Gart" in Schöffer's establishment has the earmarks of an artistic creation. It was not the copy or translation of an existing text, neither were the plant pictures taken from given models, nor the arrangement of tables and indices borrowed from somewhere else. Of course here and there we find material, in text and pictures, recalling the manuscript herbals, but almost everywhere an amending, corrective effort can be observed. And if some years later Brunfels, Fuchs and Bock are able to give better texts and better pictures, the connection between these works, unsurpassed as they are in our time, and the "Gart" is plainly visible to the one who takes the pains to look. The creation of the "Gart" started an evolution which inside of a hundred years led to results that it had taken a thousand years to focus in the printed herbal.

If we admire the result of Schöffer's enterprise in the "Gart" of March 1485 as a real creation, its reprint by Schönsperger in Augsburg only five months later — in August — can appeal only as the copy of a masterpiece. The pictures faithfully and accurately copied by skilful craftsmen, the text revised into the German dialect with which we are more familiar, set up in fine type, make this book

also a precious witness to the efforts of the times which undoubtedly it helped to further. But here the publisher's enterprise — in our days of copyright we would call it piracy — has none of the glory of Schöffer's genius, none of its spontaneity and freshness, its virtues are those of its original.

The one outstanding and most significant feature in the Editio Princeps and its Augsburg replica, I see in the fact that here for the first time the attempt has been made in printed form to present plant pictures in their natural size or approximately so. That had not been done since classical times of which we know but one or two retracings by Byzantine hands. And Schöffer knew nothing of these. But he or his artists saw the necessity of drawing away from the restrictions of the miniaturist. The subtle and characteristic curves of a stem, the outlines of leaves, flowers and fruits were lost in the cramped space at the disposal of the herbal painter, or the curves were exaggerated or put into symmetrical order just to make a decorative picture. In the incunabula period only one of the immediate successors of the "Gart", the plattdeutsche Gaerde of Lübeck (1492), adhered to the larger pictures, here promoted by another great printing master, Stephan Arndes, who also by extensive additions from other sources considerably enlarged the size of the book.

In all the other editions, for reasons of economy, the text was set up in two narrow columns into which the pictures had to be fitted. By this the printer adopted the method of the scribes of the manuscript herbals. With the reduction of size of the original "Gart" pictures, often an entire change in the style of the plant representations takes place. Though adhering to the faithful rendering of naturalistic details, such as the flowers and shapes of leaves, the stems and branches of the plants are moulded and twisted into conventional and symmetrical curves. It is a reversion to the ancient practice of the miniaturist, but often based on a better model. None the less it can easily deceive one into thinking that the woodcutter was copying from a manuscript, when he had seen nothing but the originals of the "Gart". It is evident that this method of copying led often to a deterioration very similar to the one that takes place in the series of MS. herbals. It can be set down that whenever a serious effort toward greater faithfulness in plant delineation was made, the larger size was adopted. Thus when in the early XVIth century the next steps were taken by the great masters of botany, they again took to the larger pictures started by Schöffer's "Gart", to be followed in their turn by series of editions with the smaller ones.

The recognition of this fact does not take away from the potential influence which the successors of the "Gart" exerted, in spite of their smaller pictures, on the evolution of scientific representation. The improvements of detail in many of these small pictures marked a great step in advance beyond the miniatures of the MS. herbals. Only by a careful study and comparison of the various editions can one follow the red thread of the upward trend, in spite of passing deteriorations which set in, recognizable as isolated features and without serious influence on the general development.

The comparison of all extant editions allows one to distinguish lines of stylistic evolution which one does well to study separately. Local cultural tendencies are reflected therein not only in the style of the drawing and woodcutting, but in the forms of types and other ornamentations, and in the dialectal variations of the language employed. So we can trace two distinct lines of development of the "Gart" series which in turn induce further ramifications. There is the Augsburg line starting from the large picture reprint (1485) of which I have already spoken, and continuing in a series of reprints with smaller pictures of which beautiful specimens are in this collections. How this line is related to the other, the Strasburg, series has yet to be studied in detail. The latter seem to have pursued its own independent course and on this I wish to say something.

The Strasburg series of small picture "Gart" editions, also printed in two columns, I think sprang more directly from the Mainz original and curiously enough, with one exception, an Ulm edition, extended its influence along and westwards of the Rhine, that is, nearer to the lands from which came the text and the idea of the illustrated herbal in the French Platearius. Here Strasburg and Basel become the centres from which this influence radiates. There are still some nonluminous rays in this radiation, but already we have a comforting amount of clarity in this matter which was rather obscure.

The compiler of this catalogue has well noticed the relationship existing between the plant cuts of the French Arbolayre*) and one

*) We will not discuss here who was the printer of the Arbolayre. On typographical grounds it is assigned to Peter Metlinger, the co-worker and son-in-law of Hans Amerbach of Basel and probably also the brother of Bartholomaeus Metlinger, physician of Augsburg, who had a hand in making the early presses work for medicine as early as 1473 when they printed his first paediatric manual in German. This Peter Metlinger we know worked in the Franche Comté during the last two decades of the XVth century, called hither by ecclesiastical authority, notably by the Bishop of Besançon. With Amerbach for a while after 1480 Grüninger is known to have worked, and Furter was another one of his workmen, so that it can be presumed that he had more to do with the preparing and printing of these books than research so far has been able to reveal.

"Gart" edition which is assigned on typographical grounds to Furter's press in Basel. We find indeed an intimate relation between the Arbolayre (54) and this Basel "Gart" (28). For the plant pictures in both the identical wood-blocks had served. Also the frontispiece, an adaptation from that in the Mainz book, was printed off from the same block. Also the white on black woodcut initials appear in both editions. But the state of the impressions in the Basel edition shows clearly, as we will see later, that it was printed not before the Arbolayre, as would seem plausible, but afterwards. A decision about this the present cataloguer has left open, for he dates both editions "about 1490". We have, however, a fairly certain date for the first employment of these wood-blocks of plants, and this is given by the fact that we find them in their earliest and freshest state in Grüninger's Strasburg "Gart" (25). I have already alluded to this, also to my readiness to accept for the date of its issue one very close upon the appearance of the Mainz "Gart" of March 1485 (22), possibly before the end of that year or early in 1486. The given date of the first small-cut edition of the Augsburg series, June 1486 (24), cannot help us in the fixation of this date, for, as already stated, there does not seem to be any connection between the two series of editions. The date is given by the type*) Grüninger employs and that must be close around the end of 1485 and I believe we can safely take this date as the starting point for the series.

Now we have another edition, signed and dated, which can serve us for the fixation of a terminal date. It is that of Dinkmut at Ulm, March 1487 (26). The plant pictures of this edition are derived from blocks newly cut, after designs closely based, with only slight modifications, on those which we now know served in Strasburg, Basel and Besançon. Dinkmut had at least one year's time to have his blocks cut and that, as we have seen, was ample for the capacity of the workmen of the day. But he did not copy from Grüninger at all, but from one of the two reprints made with his blocks in Basel and Besançon. This is suggested by the fact that the frontispiece he uses in his edition is not a copy from the one in Grüninger's book, but is derived from what we may term the Arbolayre frontispiece. Since we cannot well imagine that the Arbolayre frontispiece was obtained from Ulm we would be forced to conclude that the Arbolayre or the

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*) Thus far it has not been noticed that this type is identical with the one Schöffer used in his Gart. Grüninger probably acquired the fount for his Gart and the German Bible of May 2, 1485.

Furter editions, or both, must have appeared before March 1487, a conclusion that would materially alter our chronological order.

I know how risky it is to date editions on the sole evidence of the woodcuts, the blocks of which in these times had mysterious ways of wandering from one printer to the other serving in different books. The question seems to turn around this single frontispiece, thus it is necessary to be very circumspect when drawing conclusions. But since this frontispiece was evidently designed for a herbal and for nothing else, we may be allowed a certain liberty.

Let us consider the picture more closely. The design is inspired by the titlecut of the Mainz "Gart" which we are inclined to assign to Reuwich or whoever was the artist of the Breydenbach. In both the Augsburg and Strasburg series only the background of this frontispiece is modified. There we have the shelves of an apothecary's shop with an apprentice working a mortar, here we have attendants to the three sages in the foreground, in lesser number than in the original and differently clad. In the eyes of the artist, and probably also in those of the public, the three principal figures with their symbolical attributes pointed to the contents of the book in an unmistakable way. Two sages sit opposite each other, one beturbaned and bearded, likely meant to represent Arabic wisdom, seems to lecture to the other younger and beardless one, whose garb indicates the contemporary scholar or physician, who listens attentively. His hands hold an open book as if comparing his notes with the words of the other. This one has also a book, it is closed, and one of his hands rests upon it while in his other he holds up, as if demonstrating, a fresh plant. To this botanical specimen the third of the group, apparently the highest authority — he sits between the two and somewhat above them — points with one hand, while his other also rests upon a closed volume. He is bearded, and richly clad, with jewels on his wide collar. He may well represent the classical genius in Byzantine garb. Classical and Arab wisdom showing the path of direct observation in science to the youthful scholar. The copyist has faithfully rendered this symbolical trinity, only in the Strasburg copy the three appear in the same order as in the Mainz original, while the Arbolayre copy gives them in the reversed order.

In the background of the original Mainz frontispiece we have ten men more or less interested in the learned disputation. By their costume they appear as well-to-do citizens of local origin, except for two who may be meant to represent a Turk and a Hebrew. The copyist having somewhat less width at his disposal left out one

of these personages. But he clad them differently, in costumes which seem to me to have a distinctive Burgundian cast. The style of the drawing is not French, but it shows French influence aside of the merely external feature of dress, somewhat in the manner of those transitional woodcuts of Lyons which led soon to a complete emancipation from the German artists who had introduced their art there.

Grüninger's variant of this frontispiece exhibits unskilful workmanship. The details of the picture are identical with those of the Arbolayre cut (reversed), but the drawing was done independent of the other, namely without tracing. Whatever its origin it does not seem likely that the Arbolayre drawing was made after it. Having the positive certainty that the Grüninger plant cuts were used by him in their first state, including the little genre picture of a physician and a woman for the treatise on urines, and that these were all used in Basel, and a certain number of them, without the genre picture, in Besançon, it is very difficult to understand why we do not find in the Grüninger edition the same frontispiece, but one of a different make though with all the characteristic Burgundian attributes, and having all the earmarks of a derivative.

The Arbolayre variant of the frontispiece, as stated, has with the Grüninger cut only the drawn details in common, but it coincides point for point and line for line with both the Basel and Ulm variant. Any casual observer provided with a careful tracing of one of these three frontispieces on transparent paper can easily verify this although in the Ulm cut the top portion is altered. Here the entwined branches of the others are replaced by a geometrical design in the shape of a formal vaulting. Nevertheless a very close examination of the three impressions reveals some minute differences, which are in the way of a positive affirmation that the same block was used for the three books. It is practically impossible to describe and enumerate these differences without a demonstration of the objects. Briefly summed up, the main differences are found in some hatched portions of the design in that corresponding ones show in one case clear hatchings, in the other solid black areas*). This is easiest observable in the collar of the central sage, in the belt of one man on the extreme left, in the shoes of the three main personages and also in the eyes of some others.

I have stated these differences so that I may not be accused of not having noticed them, but I am inclined to disregard them entirely

*) I must here warn the reader not to put too much faith in facsimile cuts. So for instance what is said here cannot be verified by the facsimile given in Claudin IV 480, which is badly retouched and most confusing.

and declare myself for the identity of the three blocks, for I believe that these differences can be explained by differences of inking and not of cutting. If one remembers that when the woodcutter wants to represent, for instance, two parallel black lines, as in a belt, he leaves these two lines on the block untouched while carving away the adjoining wood, so that they stand out in relief. When inked carefully, none of the colour, which has a thick and sticky consistency, will enter into the hollow between the two lines, it will only cover their printing surfaces and give the desired impression. But when the inking is done carelessly or too much ink is on the pad with which it is applied, it can easily happen that some of it gets between the two ridges. If sufficient ink accumulates and is left to dry in, the impression will not show two parallel lines, but a single thick black one. This gave the printer an opportunity for scolding the apprentice who had been careless in the inking and had failed to clean the cut (a necessary operation from time to time) or, and that is the telling point, he might have liked the looks of the black thick line and the process suggested itself to him by which he could vary at will the impressions from a given block. All of the differences in our three variants, taken one by one, can be explained by this expedient of purposely leaving the ink (or some other suitable medium) standing and drying in some of the hollows while the other parts were kept clean. In the Ulm cut a little more was done. The printer had to shorten the cut by about 2 cm. So he boldly sawed these 2 cm off the top. That left the blank shield untouched but cut through the branches holding it, so he carefully cut away these, just leaving intact the two trees of the background. Then he substituted for the upper portion of the shield a little wooden composition of his own so that it would print solid black (coat of arms of Ulm) and attached it by a string to the vaulting which he had no great difficulty to fashion as a part of the new frame with which he surrounded the entire block. (Fig. 26.)

Now one word has to be said about the plant cuts. I have already stated that by certain deficiencies we can ascertain the sequence of their employment. There are practically no deficiencies in the impressions of the Strasburg "Gart". There are not many in those of the Arbolayre but still they are discernible. But in the impression of the Basel "Gart" these defects are plainly visible*). I cannot go into details here but will simply point out an especially striking one.

*) I give here a few of the cuts with their numbers in the "Gart" editions for the purpose of verification: Elleborus niger 166, Cardo benedictus 96, Enula campana 154, Plantago major 308, Cepe 103 (Hortus 108).

The impressions of Cepe No. 103 in the Strasburg "Gart" and on leaf 84 b [Sig. M ^{5}] of the Arbolayre are from the same block in a similar state of freshness. In the Basel "Gart" the impression of this cut has a sharply defined white spot (in the form of a parallelogram measuring 5 by 20 mm) which must have corresponded to a permanent defect in the block. (In the present copy No. 28, the spot is covered by hatchings added by pen, but it is quite clear in other copies.) We can accurately verify this, for this and the other blocks were used again some ten years later in three editions of the Hortus sanitatis (Nos. 46, 47, 48 of this catalogue), without the numbers which had now been really cut away. (See remains of numeral in Enula campana 177.) Here Cepe illustrates Cap. 108 and in every one we find this same defect. From this there is only one conclusion possible, that the injury took place before the printing of the Basel edition. I believe it may even be shown that it was inflicted to the block in Besançon with the same instrument used for eliminating the Roman serial figures. That they were not cut away in Besançon is quite certain, for some of the eliminated ones reappear again in the Basel "Gart" where they correspond with the chapter headings. I believe that a square ruler with a section of 5 × 20 mm was used to cover the numerals during the inking — the remains of some of them are an indication of this — and that this instrument wrongly and strongly placed upon the design of Cepe itself produced the telling injury. This may be so or not, it does not alter the fact that the blocks were first used in Strasburg, then in Besançon, then in Basel and finally again in another book in Strasburg. Grüninger must have sold them to Basel for in his reprint of his own "Gart" (my No. 9) he employs an entirely new set of blocks copied from his own, together with the original block for the frontispiece of his first edition *).

I have stated that the Arbolayre pictures are all from the blocks used for the Strasburg and Basel impressions. There are, however, two substitutes, for Laudanum (Gart No. 239) and for Sanguinaria (Gart No. 387), in the Arbolayre, which are not found in the two other editions**). The Laudanum substitute was certainly intended for a "Gart" edition, for it has the numeral CCXXXIX on the right side of the plant, while in the others it is on the left. This only as a matter of record. I do not think it has any bearing on the question of chronological sequence.

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*) Schreiber's assertion (o. c.) that Schöffer sold the wood blocks of the "Gart" of 1485 to Basel is entirely unproven.

**) The undated Hortus sanitatis used the original cut in Cap. 248.

The following table will make clearer the sequence of original and copied cuts of the frontispieces, plantcuts and initials in the editions discussed, and also fix the sequence of the editions themselves with approximate dates:

Editions	Cat. No.	Frontis-piece	Plant-cuts	Initials
Gart 6 [Strasburg, Grüninger 1485/6] . .	25	Copy A	Orig. 1	o
Arbolayre [Besançon, Metlinger 1486] . .	54	Orig. 1	Orig. 2	Orig. 1
Gart 10 [Basel, Furter? 1486/7]	28	Orig. 2	Orig. 3	Orig. 2
Gart 5 Ulm, Dinkmut 1487 March 31 .	26	Orig. 3	Copies A	o
Gart 9 [Strasburg, Grüninger 1489] . .		Copy A	Copies B	o
Hortus 2 [Strasburg, Prüss 1497] . . .	47	—	Orig. 4	o
Hortus 3 [Strasburg, Prüss 1498] . . .	46	—	Orig. 5	o
Hortus 4 [Strasburg, Prüss 1499] . . .	48	—	Orig. 6	Copy

I have gone to some length in these explanations, partly to give to the future owner something he can study in this collection, a thing that can at present not be done in any existing library, for none has all these copies and I know by my own experience that one cannot verify these details unless one has all the editions together. But if my various deductions are verified we are forced to modify thoroughly the accepted chronology of these editions, for it leads inevitably to the conclusion that the whole Strasburg line of small-cut editions were issued before the Ulm edition of March 1487. That means that we have not only to change the date of the Basel edition but also that of the Arbolayre. That the "Gart" of 1485 should have furnished the material for four editions of the Strasburg line, besides the three of the Augsburg line, seven in all, inside of exactly two years is a remarkable fact in itself. That this was not an artificial, speculative output, but corresponded to a real demand, is proven by the fact that still more reprints were published before the end of the century and even a new book started, based on the "Gart", and, as we have seen, with some of its material.

This "Ortus sanitatis", source of health, or "Hortus sanitatis", garden of health, as it is alternatively and appropriately styled by various publishers according to their orthographical inclination, is nothing but the elaboration and internationalisation of the German "Gart", notwithstanding the mass of erudite nonsense which has been put forth to prove the contrary. There are some very learned men who can and will not see that science in the Renaissance could emerge

out of a book in the vulgar tongue. Ernst Meyer (Geschichte der Botanik IV, 196) facing the fact that the first Hortus bore the date of 1491 when it appeared in Mainz from the press of Meydenbach, another one of Schöffer's family, assumed calmly that the undated editions must have been issued before 1485 so as to inspire the vulgar "Gart". He asked: wer mag mit Sicherheit entscheiden, ob sie jünger oder älter sind? That decision has long been made and often corroborated; the Meydenbach edition is indeed the editio princeps and the undated editions are Strasburg reprints which anyone without a blind spot easily recognizes as such. Meyer wrote in 1857 and it must be said that he was the first historian who signaled the importance of the printed herbals in scientific literature. He also was the first to recognize the probable relationship of the French Platearius and the printed herbals on both sides of the Rhine. Had he had a chance, as we have today, of examining the fine examples of series of editions as represented in this collection, he would have modified considerably some of the prejudiced opinions he expressed.

Meydenbach's edition of the Hortus is a very handsome book. Animals and stones are drawn inside the wattle of the Health Garden proper, neatly tended and fertilized for the good of suffering mankind. But as by the common experience of herbalists, herbs lose their virtues by domestication after a few generations, so this Hortus, though perhaps more impressive externally, has little left of the stimulating properties of its prototype. But the ancient lore of animals, fishes, birds and stones, delightfully illustrated, gives a most convenient survey of the knowledge and superstitions of the times in these matters, and it is not hard to imagine how Conrad Gesner as a child might eagerly have turned the leaves of this book, how he would already begin to assort the probable from the improbable according to his limited experience, and how, as the latter grew with age and the observation of nature, he would be fitted to take the next step.

Before the end of the century a French translation of the Ortus was published by Vérard in Paris. In two fine tomes this is the edition de luxe of the series of which few copies seem to have survived. The one of the present collection is a very beautiful one as also that of the following reprint by Philippe Le Noir which still found a market some thirty years later. But is was the Grant Herbier, a copy of the text and the plant-cuts of the Arbolayre, which appears to have had the greatest popularity. I know of ten folio editions and of eighteen in quarto, all very rare, mostly in poor condition and difficult to distinguish. The edition by Le Caron in this collection

is probably the only and most perfect copy extant. A copy of it without the title leaf and the end leaves missing, in the Bibliothèque of the Ecole de Médecine at Paris, I had known and assigned to Le Caron, but the present copy gives the certainty of its origin. No one but the cataloguer of this collection has thus far described it. It shows that it was still Le Caron, and not as usually assumed Guillaume Nyverd his successor, who gave to the Grant Herbier the definite form which it was to preserve to the end. It was also this series from which were copied the plant-cuts which illustrate the interesting series of editions of the Latin poem known under the name of Macer floridus. The copy of this in the present collection has a special interest, as being undoubtedly printed with materials in the possession of Louis Garbin Cruse of Geneva. This printer, son of a physician, about whom the last word is yet to be said, has done most interesting work, as can be judged from the very rare remaining specimens. A great number of editions of this illustrated Macer floridus were issued in France and later in Germany, imitating the original series, a curious confirmation of the fact that it was more the illustrations than the text that determined the vogue of these books, for the first printed edition of the Macer floridus had appeared already in Naples in 1477, the earliest of all the herbals without pictures.

Much has been said, and more might be said, about the great works of those "Fathers of Modern Botany", Brunfels, Fuchs and Bock, whose books adorn this collection, but I must end. Only it may be pointed out that they went as far as one can go with the pictorial descriptive method. Their work marks the end of a development to which the "Gart" gave the impulse. Systematic botany can find new genera and species, can describe and picture them, but in doing so they will follow the method of the Masters of the XVIth century with no essential modification. To find the way in the immense number of recorded data and facts of nature, a clearer method of annotation was needed than that of the scribe or miniaturist, and this only printing could provide. Of course it was nothing but a new form of writing, but the fact of easy multiplication facilitated accurate comparison between observers remote from each other. It is the purposeful employment of this method that made it possible for those men of the XVth and XVIth century to present to the world a lucid picture of what the search in nature and the study of texts had brought together.

The period from which most of these books sprang, the fifteenth century, was one not particularly rich in achievement. But the general

paucity is amply repaired, at the end of the century, by the introduction of printing. Technique and art combined in making it the most useful handmaiden to science whose adepts, however, show a peculiar reticence in acknowledging the debt they owe to their instruments, as if they still were magicians. The debt should be paid and the early printed book and its genesis must enter into the field of serious historical research. That the roots of science are far deeper need not defer the payment. True, from the thirteenth century on we notice the refreshed interest in science. Some speak of that period as that of a re-birth, new birth and even pre-renaissance of something that took place in classical times, as if by such obstetrical phraseology something were done towards clarifying our historical insight. Let us not be mistaken, in the intellectual as in every organic evolution there is no re-birth, nothing comes again that once was, and the rule of life is change. Similarity of events properly serves as the pons asini to the detection of change. Change not similarity is the vital element in human history. And if we pick from the mass of records, those that for one reason or other appeal to us, as for instance the earliest of the printed books of science, let us value and enjoy them in the setting that produced them, mindful, if we wish, that there is nothing new under the sun, but grateful also that it shone at all, then as now.

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